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New and Little Known Species of Oribatid Mites of the Genera *Arthrodamaeus* and *Fuscozetes* (Arachnida: Acari: Oribatida) from Mongolia

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A new species of gymnodamaeid mite, *Arthrodamaeus mongolicus* sp. nov. from Eastern Mongolia, is described. In addition, two known species of ceratozetid mites, *Fuscozetes fuscipes* (C. L. Koch, 1844) and *F. tatricus* Seniczak, 1993 are recorded for the first time in the fauna of Mongolia, and are re-described based on specimens from northern and eastern parts of the country. *Arthrodamaeus mongolicus* sp. nov. is easily distinguishable from all known species of the genus by the well developed tubercles on the anterior part of the notogaster.

Key Words: Acari, Oribatida, *Arthrodamaeus*, *Fuscozetes*, new species, Mongolia.

Introduction

In the course of ecological and taxonomic studies of soil microarthropods of Mongolia, several interesting species of mites have been found, and three species belonging to the genera *Arthrodamaeus* and *Fuscozetes* are discussed in the present work.

Arthrodamaeus is a small genus of oribatid mites with 11 known species, which have been recorded only in Europe. Most of the species of *Arthrodamaeus* have been described and recorded from South Europe, especially the Mediterranean region, and only a few species are recorded from Central and Eastern Europe (Berlese 1910, 1916; Grandjean 1928; Sellnick 1928; Kunst 1958; Paschoal 1984; Woas 1992; Subias *et al.* 1997). We found one new species from Eastern Mongolia, which is the first record of this genus in Asia.

The genus *Fuscozetes* is also small, with 12 known species, distributed mostly in Europe with some extension in North America. During our investigation we found two known species, *Fuscozetes fuscipes* (C. L. Koch, 1844) and *F. tatricus* Seniczak, 1993, in eastern and northern parts of Mongolia. The first species, *F. fuscipes*, is widely distributed in the Palaearctic Region, while *F. tatricus* has been recorded only from Poland. Both of them are recorded here for the first time in Mongolia. The redescrptions refer mainly to Mongolian specimens.

In the measurements of species, for each the mean value is given in parenthe-

ses after the range. The morphological terminology used in this paper is based on that developed by Grandjean (1928).

Taxonomy

Arthrodamaeus mongolicus sp. nov.

(Figs 1, 2)

Diagnosis. Medium in size. Body and legs covered with thick cerotegument consisting of round granules; rostral seta covered with cerotegument, inserted laterally; lamellar seta covered with cerotegument, situated dorsolaterally; sensillus with moderately long stalk and densely barbed, club-shaped head; pair of weakly developed ridges situated anteromediad of bothridia; notogaster with pair of tubercles situated posterior to bothridia; five pairs of notogastral, seven pairs of genital, and two pairs of adanal setae; legs tridactylous.

Description. *Measurements.* Body length 501–617 (567) μm , maximum width of notogaster 286–373 (328) μm .

Integument. Body colour reddish to deep reddish-brown. Body, anal and genital plates, and legs with relatively thick cerotegument consisting of round granules. Exuvial scalps absent.

Dorsal and lateral views. Rostrum rounded in dorsal view, but distinctly projecting in lateral view. Rostral seta moderately long, covered with cerotegument, inserted laterally on prodorsum. Lamellar seta covered with cerotegument, nearly as long as rostral seta and inserted dorsolaterally on prodorsum. Interlamellar seta minute, hardly visible. Exobothridial seta medium long, covered with cerotegument. Sensillus with moderately long stalk and club-shaped head with dense barbs. Bothridium relatively large, directed posterolaterad. Pair of weakly developed ridges situated anteromediad of bothridia (Fig. 1A, C). Notogaster oval, about 1.5 times as long as wide. Notogastral cerotegument with four longitudinal ridge-like structures; median two connected anteriorly and posteriorly to each other, while lateral two connected to these posteriorly by median ridges (Fig. 1C). Pair of well-developed tubercles present on anterior margin of notogaster, situated posterior to bothridia. Five pairs of notogastral setae covered with thick cerotegument. Setae h_1 and h_2 situated on dorsal side, p_1 , p_2 , and p_3 situated on posteroventral side of notogaster. Lyrifissures *im*, *ih*, *ip*, and *ips* well developed, *im* obliquely and *ip* longitudinally oriented, *ia* not evident (Figs 1A, C, 2A).

Ventral view. Infracapitular mentum wider than long, with a few microtubercles. Hypostomal setae *a*, *h*, and *m* well developed, thin, smooth (Fig. 1B). Chelicera and palp normal, typical for family. Apodemes I and II well developed, other apodemes not evident. Pair of strongly developed tubercles *Sp* present on epimeral region III, situated below leg acetabula III (Fig. 1B). Epimeral setae short, smooth, seta *3c* not evident; epimeral setal formula 3-1-2-3. Discidium absent. Genital and anal apertures well separated from each other, anal aperture larger than genitals. Seven pairs of genital, one pair of aggenital, two pairs of anal, and two pairs of adanal setae; genital and aggenital setae conspicuously shorter than anal and adanal setae. Adanal lyrifissure in paranal position, inserted at level a little anterior to seta *an*₂ (Fig. 1B).

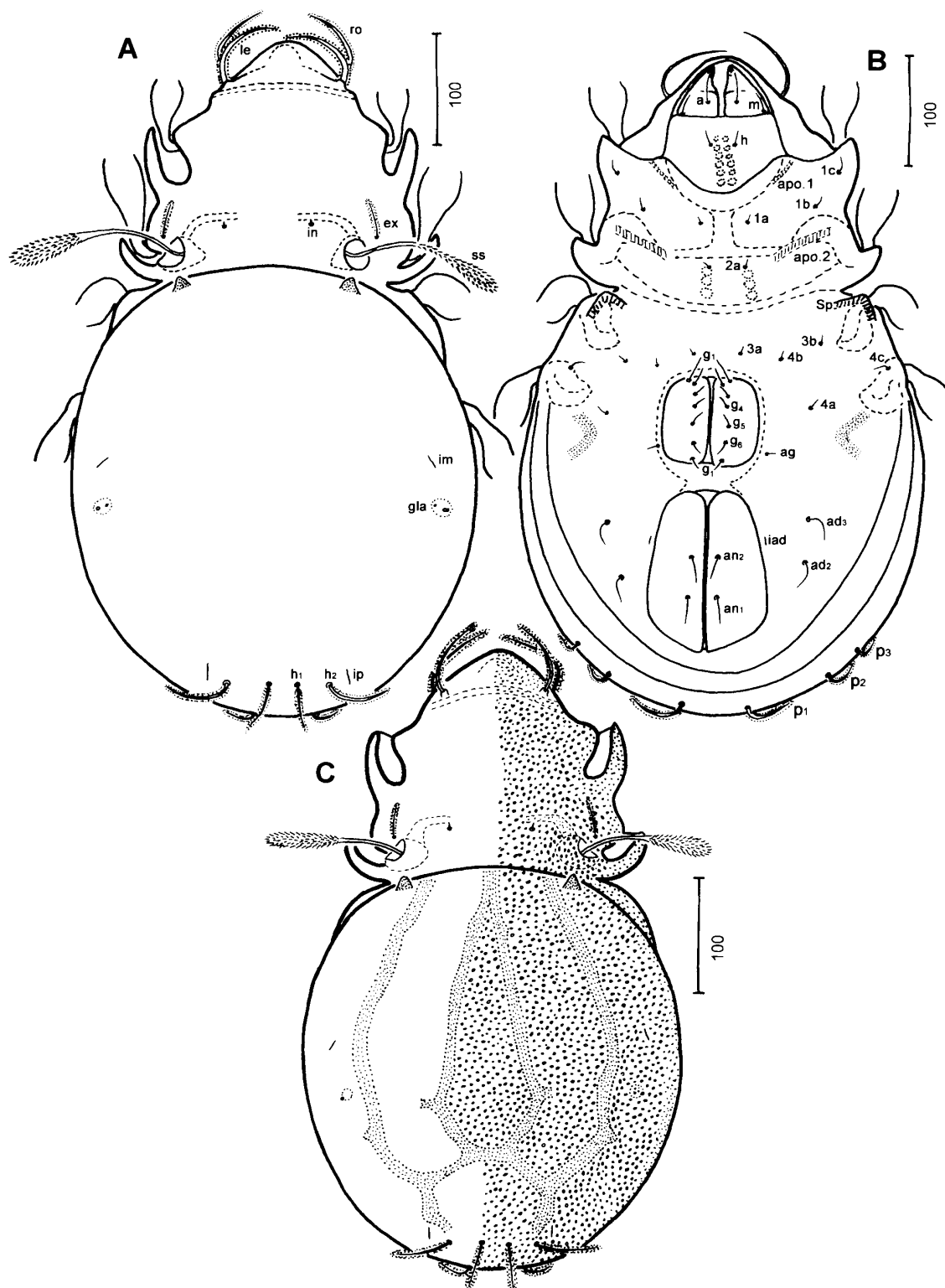


Fig. 1. *Arthrodamaeus mongolicus* sp. nov., holotype (A and B, DOM 25-001) and paratype (C, DOM 25-002). A, Dorsal aspect; B, ventral aspect (cerotegument removed for both); C, dorsal aspect of a paratype with cerotegument only partly removed. Scales in μm .

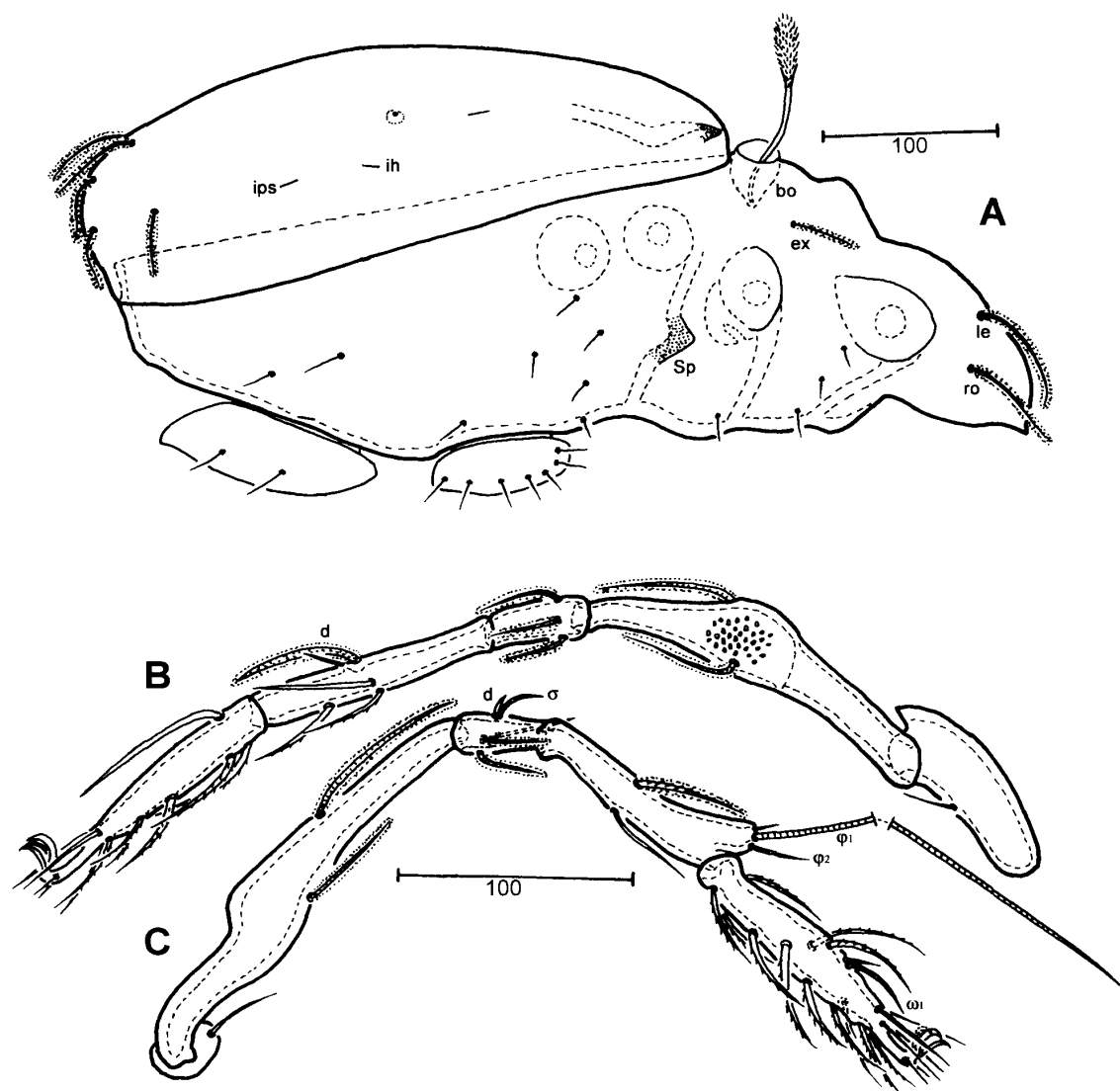


Fig. 2. *Arthrodamaeus mongolicus* sp. nov., holotype (DOM 25-001). A, Lateral aspect; B, right leg IV, antiaxial aspect; C, right leg I, antiaxial aspect. Scales in μm .

Legs. Legs heterotridactylous, articulation of leg segments in sockets. Ventrodistal tectum poorly developed on trochanters III and IV. Setation of legs typical for genus. Most setae of femora, genua, and tibiae covered with cerotegument, while those of trochanters and tarsi mostly smooth (Fig. 2B, C).

Material examined. Holotype and 12 paratypes: Mt. Lkhachinvandad, Erdenetsagaan District, Suhbaatar Province, $45^{\circ}40'54''\text{N}$, $116^{\circ}07'57''\text{E}$, 1242 m a.s.l., organic debris and soil accumulated under shrubs, 01 June 2003, Col. B. Bayartogtokh. Three paratypes: Gurvan Golyn Belchir area, Numrugiin Gol river basin, Khalkhgol District, Dornod Province, $46^{\circ}57'02''\text{N}$, $119^{\circ}30'51''\text{E}$, 972 m a.s.l., litter of bushes, 27 May 2003, Col. B. Bayartogtokh. The holotype (DOM 25-001) and ten paratypes (DOM 25-002–011) are deposited in the collection of the Department of Zoology, National University of Mongolia, Ulaanbaatar, Mongolia, and five paratypes in the collection of the Laboratory of Soil Zoology and Ecology, Free University

Berlin, Germany.

Remarks. *Arthrodamaeus mongolicus* sp. nov. is easily distinguishable from all the known species of the genus by the well-developed tubercles on the anterior part of the notogaster; no other species of *Arthrodamaeus* has any tubercles on the notogaster. In addition to this principal character, other species of *Arthrodamaeus* can be differentiated from the present new species as compared below.

The Mediterranean species *A. mediterraneus* Subias, Arillo and Subias, 1997, *A. rosarius* Subias, Arillo and Subias, 1997, *A. bicristatus* Subias, Arillo and Subias, 1997, *A. italicus* (Berlese, 1916), *A. octosetosus* Subias, Arillo and Subias, 1997, *A. hispanicus* Grandjean, 1928, and *A. reticulatus* (Berlese, 1910), described or re-described by Subias *et al.* (1997) and Pérez-Iñigo (1997), differ from *A. mongolicus* in having a reticulate or foveolate notogaster, a different number and arrangement of the notogastral setae, and well-developed prodorsal apophyses.

The European species *A. femoratus* (C. L. Koch, 1840) and *A. parvulus* Kunst, 1958, redescribed by Woas (1992), are distinguishable from *A. mongolicus* by the well-developed prodorsal apophyses, the different position of the notogastral setae, the strongly developed discidia, and far larger body size.

Another European species, *A. ignotus* Paschoal, 1984, differs from the new species in having a reticulate notogaster, differently positioned notogastral setae, small but distinctly developed ventral tubercles *Sa* and *Sp*, and strongly developed discidia (cf. Paschoal 1984).

Etymology. The specific name “*mongolicus*” refers to the name of the country that encompasses the type locality of this species.

***Fuscozetes fuscipes* (C. L. Koch, 1844)**

(Fig. 3)

Oribates fuscipes C. L. Koch, 1844 (as a loose-leaf sheet without pagination).

Oribata fuscipes: Michael 1883: 241, pl. 7, figs 1–2, pl. 23, fig. 8; Ewing 1909: 360.

Galumna slossonae Banks, 1906: 490, figs 1–3. [Synonymized by Marshall *et al.* (1987)]

Oribata slossonae: Ewing 1909: 382.

Fuscozetes fuscipes: Sellnick 1928: 11, fig. 16; Willmann 1931: 168, figs 269–270; Jacot 1935: 315; Schweizer 1956: 339, fig. 305; Shaldybina 1975: 282, fig. 674; Seniczak 1989: 238, fig. 13; Seniczak *et al.* 1990: 388, fig. 6; Pavlitshenko 1994: 36, fig. 34.

Diagnosis. Rostrum rounded in dorsal view, but slightly projecting in lateral view; rostral, lamellar, and interlamellar setae moderately long, barbed; lamellae wide, with broad translamella; lamellar cusps with small but distinct lateral teeth, inner teeth absent; sensillus medium in length, with barbed, fusiform head; tutorium narrow, distally pointed; ten pairs of notogastral setae long, nearly smooth or minutely barbed; porose areas round to oval.

Description. *Measurements.* Body length 629–676 (656) μm ; maximum width of notogaster 419–443 (434) μm ; length of notogaster 489–524 (507) μm . European specimens may be larger.

Integument. Body colour deep reddish brown, with thick cerotegument, roughened by very small granules.

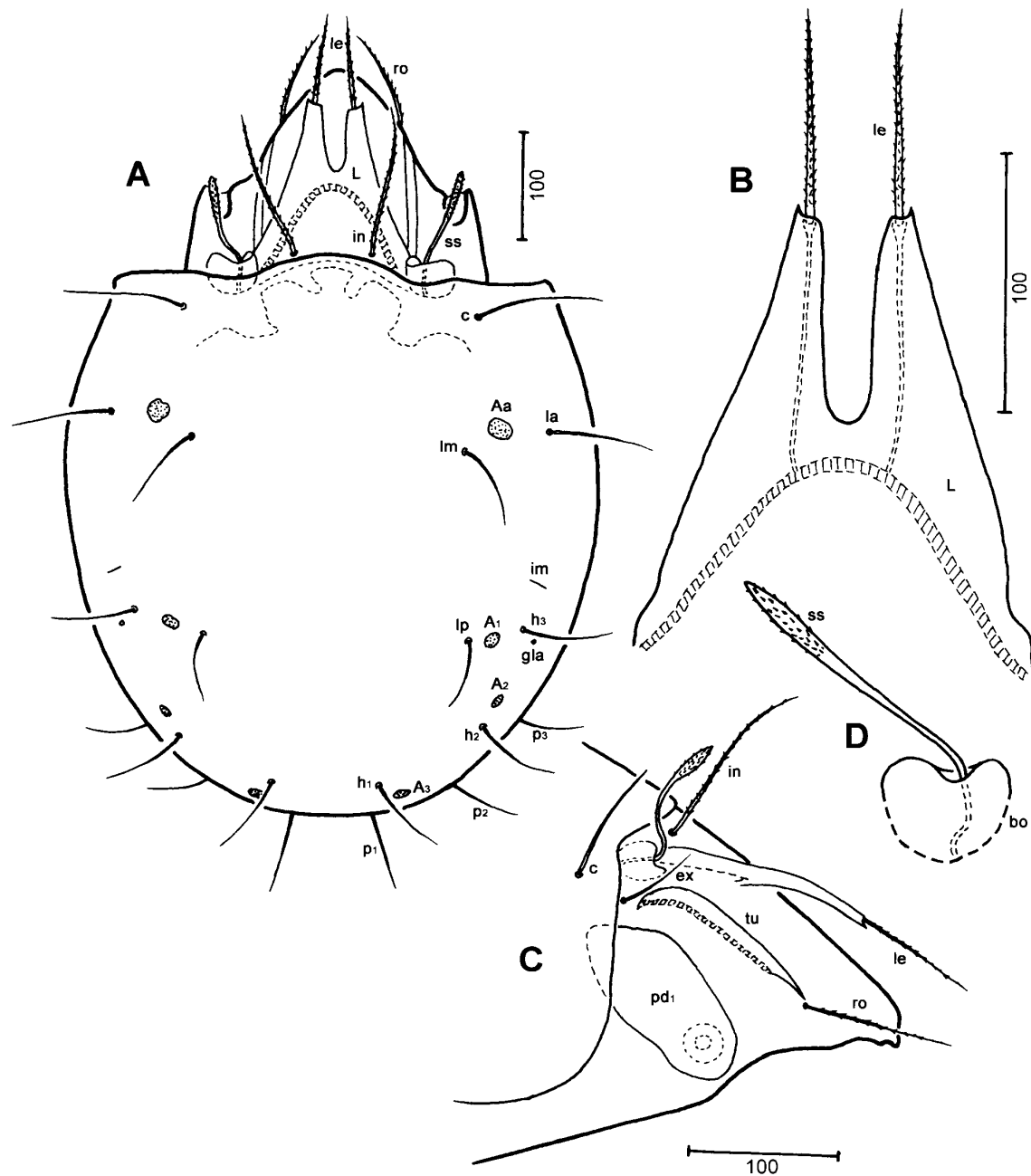


Fig. 3. *Fuscozetes fuscipes* (C. L. Koch, 1844), MG 01-001. A, Dorsal aspect; B, lamellae; C, prodorsum, lateral aspect; D, sensillus and bothridium. Scales in μm .

Dorsal and lateral views. Rostrum rounded in dorsal view, but slightly projecting in lateral view. Rostral, lamellar, and interlamellar setae moderately long, barbed, seta *in* longest and *ro* shortest (Fig. 3A, C). Lamellae wide, long, converging anteriorly; lamellar cusp with small but distinct lateral tooth, while inner tooth absent or at most angular. Translamella wide, short (Fig. 3B). Sensillus medium in length, with thin stalk and barbed, fusiform head. Bothridium moderately large, but its opening relatively small (Fig. 3D). Tutorium narrow, with pointed distal tip (Fig. 3C). Notogastral setae thin but moderately long, similar in

length to one another, with minute, sparse barbs. Porose areas round to oval, *Aa* largest, *A₂* smallest (Fig. 3A).

Ventral view. Structure of ventral region similar to that of the next species. Most of ventral setae smooth, except barbed epimeral seta of *1c* and hypostomal seta *h*. Six pairs of genital, one pair of aggenital, two pairs of anal, and three pairs of adanal setae.

Material examined. Thirty specimens (24 females and six males, MG 01-001-030): Minj Gol river basin, Mandal District, Selenge Province, 49°12'24"N, 108°30'16"E, 1010 m a.s.l., soil under willow growing on bank of river, 27 July 2002, Col. B. Bayartogtokh. The studied specimens are preserved in the collection of the Department of Zoology, National University of Mongolia, Ulaanbaatar, Mongolia.

Remarks. The character states of the examined specimens accord well with those of European material studied by Shaldybina (1975), Seniczak (1989), Seniczak *et al.* (1990), Pavlitshenko (1994), and Weigmann (unpublished).

***Fuscozetes tatricus* Seniczak, 1993**
(Fig. 4)

Fuscozetes sp. 2: Seniczak, Behan-Pelletier and Solhoy 1990: 388, fig. 5.

Fuscozetes tatricus Seniczak, 1993: 169, figs 1–3.

Diagnosis. Rostrum rounded with two incisions laterally in dorsal view, but slightly projecting anteroventrad and with few serrations in lateral view; rostral, lamellar, and interlamellar setae moderately long, barbed; lamellae wide, with broad translamella; lamellar cusps smoothly rounded distally, without lateral or inner teeth; sensillus medium in length, with club-shaped head; tutorium narrow, with moderately long, pointed distal tip extending beyond insertion of rostral seta; ten pairs of notogastral setae long, conspicuously barbed; porose areas round to oval.

Description. Measurements. Body length 641–676 (660) μm ; maximum width of notogaster 478–509 (493) μm ; length of notogaster 513–536 (524) μm .

Integument. Body colour deep reddish brown, with thick cerotegument, roughened by very small granules. Integument nearly smooth.

Dorsal and lateral views. Rostrum rounded with two incisions laterally in dorsal view, but slightly projecting anteroventrad and with few serrations in lateral view. Rostral, lamellar, and interlamellar setae moderately long, barbed, seta *in* longest and *le* shortest (Fig. 4A, D). Lamellae wide, long, converging anteriorly; lamellar cusp smoothly rounded distally, with neither lateral nor inner teeth. Translamella wide, short (Fig. 4C). Sensillus medium in length, with thin stalk and barbed, club-shaped head. Bothridium moderately large, but its opening relatively small (Fig. 4E). Tutorium narrow, with moderately long, pointed distal tip extending beyond insertion of rostral seta (Fig. 4D). Notogastral setae moderately long, similar in length to one another, conspicuously barbed. Porose areas round to oval, *Aa* largest, *A₃* smallest (Fig. 4A).

Ventral view. Hypostomal setae *a* short and thin, setae *h* and *m* relatively long, seta *h* barbed. Epimeral region nearly smooth, apodemes *apo.2* and *apo.sj* well developed, almost parallel to each other. Epimeral seta *1c* long, barbed, other setae

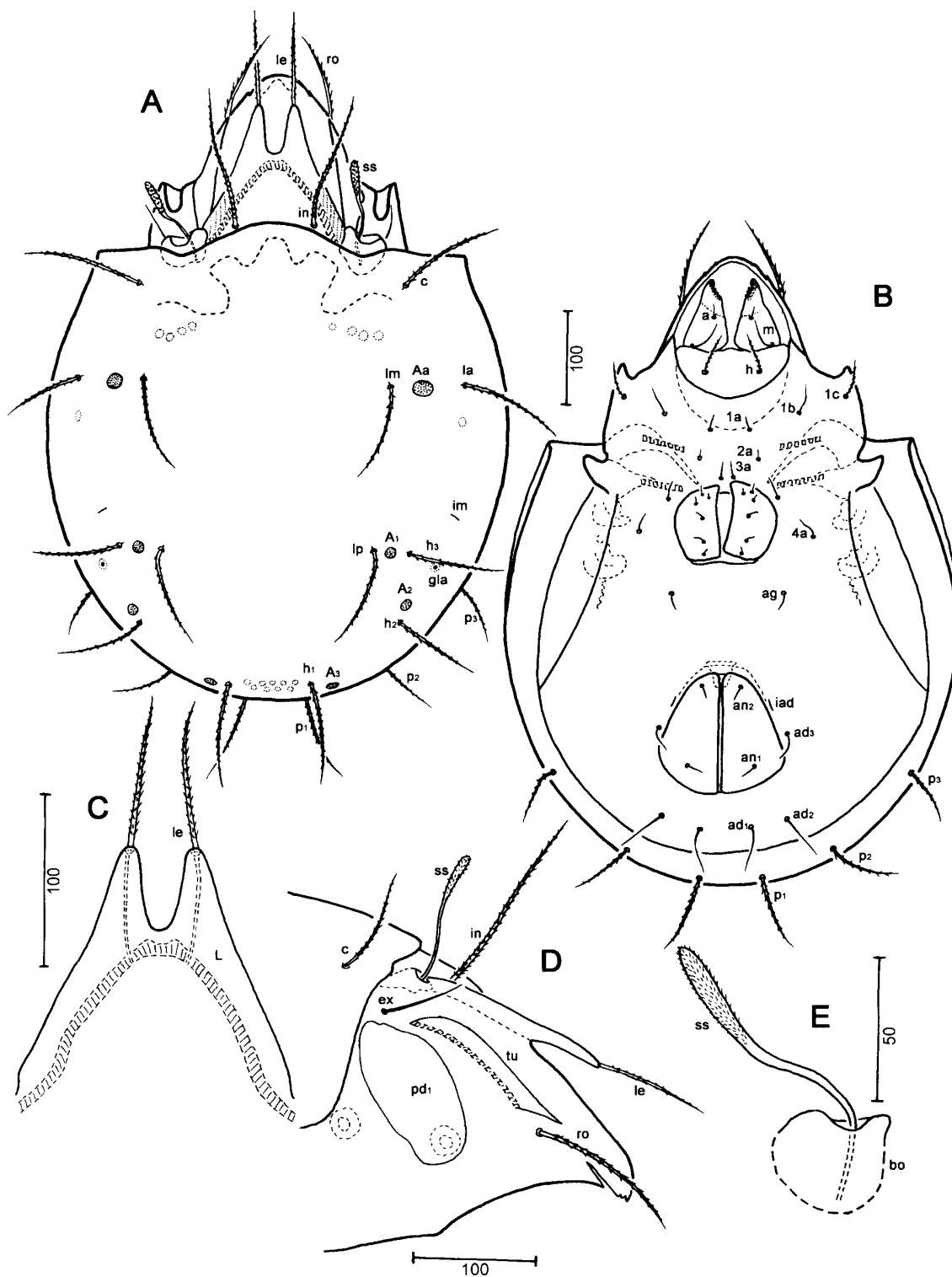


Fig. 4. *Fuscozetes tatricus* Seniczak, 1993, DOM 36-001. A, Dorsal aspect; B, ventral aspect; C, lamellae; D, prodorsum, lateral aspect; E, sensillus and bothridium. Scales in μm .

smooth. Circumpedal carina well developed, reaching to lateral margin of ventral plate. All anogenital setae smooth: six pairs of genital, one pair of aggenital, two pairs of anal, and three pairs of adanal setae; ad_1 and ad_2 far longer than other setae.

Material examined. Two specimens (females): Numrugiin Gol river basin, Khalkhgol District, Dornod Province, 47°00'39"N, 119°22'59"E, 904 m a.s.l., bogs near river, 26 May 2003, Col. B. Bayartogtokh. Five specimens (three females and two males): Degee Gol river basin, Khalkhgol District, Dornod Province, 47°07'58"N, 119°10'57"E, 888 m a.s.l., soil under grass on river bank, 28 May 2003, Col. B. Bayartogtokh. The studied specimens (DOM 36-001–007) are preserved in the collection of the Department of Zoology, National University of Mongolia, Ulaanbaatar, Mongolia.

Remarks. The features of the Mongolian specimens correspond well with those of the material studied by Seniczak *et al.* (1990) and Seniczak (1993). In the character of the lamellar cusps, *Fuscozetes tatricus* is similar to *F. novus* Shaldybina, 1969 from Russia. However, the latter species differs from the former in the relatively short tutoria with very short distal tips, which do not reach the insertion of the rostral setae; the relatively wide lamellae and lamellar cusps; and the presence of 11 pairs of notogastral setae (cf. Shaldybina 1969).

Fuscozetes tatricus is also similar to *F. fuscipes* in some characters, but differs from the latter species in the smoothly rounded tips of the lamellar cusps in contrast to the well-developed lateral teeth there in *F. fuscipes*, and the clavate rather than fusiform sensilli (see above).

This species has been recorded before only from Poland and Austria (Weigmann unpublished data).

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